

### **Tile mounting system and method**

The present invention relates to a tile mounting system, comprising at least one substantially flat grid element with a number of mutually intersecting walls defining  
5 tile compartments lying therebetween. The invention also relates to a method for tiling a surface.

In toilets, bathrooms and other sanitary or otherwise wet spaces, optionally glazed ceramic tiles are usually chosen for final finishing of walls and floors. Ceramic tiles  
10 are characterized by a low susceptibility to the growth of fungi and bacteria, together with a high resistance to moisture, acids and cleaning products, a high scratch-resistance and therefore durability, and they moreover have an extremely attractive aesthetic quality. Partly for these reasons tiles are a building material which have become almost indispensable where finishing of the above stated and other spaces are  
15 concerned. The placing of tiles is however time-consuming and requires the necessary professional skill. Using an adhesive comb, a surface is usually provided over the whole area with a special glue layer, whereafter the tiles are set therein one by one. The intermediate gaps are finally filled with a suitable grouting mortar. The relative alignment of the tiles to form a regular grid is particularly found to be an obstacle for  
20 many people.

A known aid for relative positioning of the individual tiles is formed by so-called tile spacers. These can be applied separately but can also be prearranged on a mat or grid, as known for instance from the American patent US 4,761,926. The spacers herein  
25 form an integral part of a plastic matrix which is arranged between the surface and the eventual tiles. The matrix comprises compartments in accordance with the pattern of the desired tile wall. At the position of these compartments fitting tiles are glued against the surface with a suitable tile adhesive. The spacers at the corner points of the compartments herein provide the desired mutual spacing of adjacent tiles. Once the  
30 tiles have thus been arranged in the desired pattern, the intermediate gaps are filled conventionally, so-called grouting, with a suitable grouting mortar. After a prescribed

drying time the grouting mortar forms a hard and per se attractive cement filling between the tiles.

5 This same grouting mortar however also forms a weak point in every tiled wall. This is because the cured grouting mortar is slightly porous and permeable so as to also give the tile adhesive the chance to harden. However, this same porosity, and the associated surface roughness, also provides a breeding ground for dirt and fungi, and furthermore does not provide complete water-tightness, this in sharp contrast to the properties of the tiles themselves in this respect. This is enhanced still further in that  
10 through subsidence and working of walls the joints can burst and come loose, making regular inspection and even renovation necessary. This is no different in the tile system of the above mentioned American patent US 4,761,926. Furthermore, the individual placing, fastening and grouting of the tiles is still time-consuming in the above mentioned American patent.

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The present invention has for its object, among others, to provide a tile mounting system and method which obviate the above stated drawbacks.

In order to achieve the stated objective, a tile mounting system of the type stated in the  
20 preamble has the feature according to the invention that the grid element is at least substantially form-retaining, that the walls bound the tile compartments laterally and that the walls are adapted to receive thereagainst a tile in a tile compartment. The tiles are here received within the compartments bounded by the walls of the grid element. These walls thus simultaneously form an exact mutual spacing between the tiles and  
25 at least a partial filling for the gaps formed thereby between the tiles. The fact that this joint filling forms part of the grid element prevents the possibility of it later breaking or bursting out of the joint.

In a preferred embodiment, the tile mounting system has the feature according to the  
30 invention that the walls are provided on their side directed toward a tile compartment with a moisture seal for receiving a tile thereagainst. Such a moisture seal on the

compartment side of the walls provides the desired water-tightness of the joints. In the case of a partial filling of the gaps by the walls, the gap can be further filled with a suitable filler which is no longer required to be impermeable. A tile mounting system more particularly has the feature according to the invention here that the moisture seal  
5 comprises a flexible strip extending in the tile compartment. The form of such a strip can adapt to possible, inevitable dimensional variations in the tiles, so that a watertight whole nevertheless results.

A further particular embodiment of a tile mounting system has the feature according  
10 to the invention that the grid element, for the purpose of receiving a tile thereon, extends partially along the walls within the compartments. The grid element itself thus provides a base on which tiles can be mounted. The tiles are in that case mounted via the grid element instead of directly onto the surface. This provides possibilities for working with other adhesive systems or mounting techniques than in the case of direct  
15 glueing to the surface. This opens the way to mounting techniques which are suitable for an environment providing relatively little ventilation and which can be already prearranged on the grid element.

A preferred embodiment of the tile mounting system herein has the feature according  
20 to the invention that the grid element is provided along the walls within the compartments with a glue layer for receiving a tile thereon. The tile mounting system more particularly has the feature according to the invention here that the glue layer also at least partially forms a moisture seal to the walls of the grid element bounding the compartment. In this case a wall can be tiled in exceptionally rapid and user-  
25 friendly manner, after one or more grid elements have been arranged against the wall, by simply placing the tiles in the compartments intended therefor and pressing them into the already present glue layer, in the form of for instance a glue or mastic bead, wherein a part of the glue layer which here may or may not flow into the gap also at least partially provides a seal and moisture barrier in the gap between the tile and an  
30 adjacent tile.

For an optionally temporary fixation of the grid element to a surface, a further preferred embodiment of the tile mounting system has the feature according to the invention that the grid element extends partially within the compartments and is provided with fastening provisions for fixing the grid element to a surface for tiling. In  
5 a first particular embodiment, the tile mounting system is herein characterized in that the fastening provisions comprise continuous bores for receiving an anchoring element therein. The anchoring element is for instance a screw or nail and penetrates via the bore into the surface while retaining the grid element. An exceptionally strong connection to the surface is possible by applying an adequate number of such  
10 connections.

A further particular embodiment of a tile mounting system according to the invention has the feature that the fastening provisions comprise gutters which are arranged in the walls and which open on a rear side of the grid element and are adapted to receive an  
15 adhesive means therein. Via the gutters the adhesive means, such as double-sided adhesive tape, a suitable glue or mastic, can be arranged between the grid element and the surface in order to realize the desired mutual adhesion.

A particularly user-friendly embodiment of the tile mounting system according to the invention has the feature that the fastening provisions comprise a self-adhesive layer  
20 arranged on a rear side of the grid element. Here the grid with the self-adhesive layer already arranged thereon need only be arranged against the surface. In order to protect the self-adhesive layer until the moment of mounting, a protective foil is preferably arranged thereon which is peeled off just before mounting.

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For the grid element use is preferably made of a convenient standard size of for instance 4x8 tiles. In order to tile larger floors or walls, a further preferred embodiment of a tile mounting system has the feature according to the invention that the grid element is provided on a periphery with coupling members which are able to  
30 co-act with coupling members of a further grid element to form a substantially form-retaining mutual connection. For the tile-work a sufficient number of grid elements is

herein applied which are coupled to each other with the coupling members to form a whole. If desired, the outermost grid elements are shortened to size so as to fit within the area of the surface to be tiled.

5 In a further particular embodiment, a tile mounting system according to the invention is herein characterized in that the coupling members comprise a snap member on a first grid element and a complementary snap cavity on the further grid element which extend from outer ends of walls of the two grid elements directed toward each other. Separate grid elements can herein be coupled to each other by snapping together the  
10 snap members and complementary cavities. Walls are thus created which continue from the one to the other grid element so as to thus form a continuous whole of tile compartments which are bounded all-around.

In another particular embodiment, a tile mounting system according to the invention is  
15 characterized in that the coupling members comprise a groove on a first grid element and a complementary rib on the further grid element which extend from walls of the two grid elements directed toward each other. Separate grid elements are herein hooked or pushed into each other to bring about the desired mutual coupling. This also results in a continuous pattern of tile compartments over the surface for tiling.  
20 The groove of the one grid element herein preferably drops over the rib of the other grid element so that moisture penetration is countered and, at least from a tile surface, a watertight whole is created.

A method for tiling a surface has the feature according to the invention that a  
25 mounting system according to one or more of the foregoing claims is fixed to the surface and that tiles are then placed in compartments provided for this purpose of a grid element of the mounting system. The grid element is thus used as aligning means for the separate tiles, which are thus placed precisely in the desired pattern without any additional aids being necessary. After being thus placed, the gap between adjacent  
30 tiles is from the outset at least partially filled and optionally sealed by the wall of the grid element between the respective tile compartments. In a preferred embodiment the method according to the invention herein has the feature that the tiles in the



compartments are adhered to the grid element. Grid element and tiles in this case form an at least substantially self-supporting whole which makes no further demands of the material and the flatness of the surface.

5 The invention will be further elucidated hereinbelow with reference to two exemplary embodiments and an accompanying drawing. In the drawing:

figure 1 shows a front view of two grid elements of an embodiment of the tile mounting system according to the invention;

figure 2 is a first detail drawing of the grid elements of figure 1;

10 figure 3 is a second detail drawing of the grid elements of figure 1, wherein a method according to the invention is performed; and

figure 4 shows a view of a second embodiment of a tile mounting system according to the invention.

15 The figures are for the most part purely schematic and not drawn to scale. Some dimensions in particular are exaggerated to a greater or lesser extent for the sake of clarity. Corresponding parts are designated as far as possible in the figures with the same reference numeral.

20 Figure 1 shows an embodiment of a tile mounting system according to the invention.

The system makes use of separate grid elements 10 which are mutually coupled in order to thus fully extend over a wall or floor for tiling. It is otherwise noted that where reference is made in the present application to a wall, this can also be understood to mean a floor or ceiling, and vice versa. Grid element 10 is

25 manufactured entirely from a suitable, form-retaining plastic, such as the high-density polyethylene (HDPE) applied here, or for instance polypropylene (PP). An injection moulding process is eminently suitable in this respect for producing the grid in a single manufacturing step.

30 Grid element 10 comprises continuous walls 11, 12 which are mutually intersecting and therein enclose a number of tile compartments 13. Tile compartments 13 are about 15x15 cm in size, adjusted to the size of the tiles to be arranged later. Each grid

element can thus contain a total of 4x8 or 32 tiles. For alternative tile sizes and/or tile shapes, use is made of grid elements with correspondingly differently shaped and dimensioned tile compartments. On a first side of the grid element the walls 11,12 end in snap members 14 which fall close-fittingly into snap cavities 15 provided in the  
5 opposite outer ends of walls 11,12 on the opposite side of the grid element, see also figure 2. These coupling members 14,15 can be easily snapped into each other so as to thus fasten together the required number of grid elements in a substantially form-retaining pattern. The system can thus be extended as required for any random surface area for tiling. The outer grid elements are optionally shortened here to adapt the  
10 system to the exact dimensions of the surface for tiling.

The grid elements extend along the edges of walls 11,12 inside the compartments and thus form along an inner periphery an edge 16 on which a tile can be received. Also incorporated in edge 16 are fastening aid which make it possible to fix the grid  
15 element to the surface. These fastening aid here comprise glue or mastic gutters 17 which open to a rear side of the grid element. Into these gutters can be injected glue or mastic which provides adhesion between grid 11 on the one hand and the wall on the other. The mastic can herein be applied beforehand or afterward via inflow openings 18 provided for this purpose on the front side. Instead of glue or mastic beads for  
20 fastening a grid element to a surface, use can for instance also be made of double-sided adhesive tape which is optionally arranged in a shallow gutter provided for this purpose on a rear side of the grid element. In addition, edges 16 comprise fastening aid in the form of continuous bores 19 for receiving anchoring elements therein such as screws or nails. The grid element can hereby be screwed or nailed, optionally  
25 temporarily, to the wall in addition to or instead of the above specified glue connection.

Once a system of grid elements is thus aligned against the wall, temporarily fixed and then definitively mounted, ceramic tiles 20 are arranged fittingly in the tile  
30 compartments, see figure 3. The walls 11,12 of the grid element which bound the compartments provide on their inside a moisture seal, so that the tiles are retained in moisture-proof manner in the compartments. The moisture seal can consist of a close-

fitting connection between the walls on the one hand and the tiles on the other, but in order to span possible dimensional variations in the tiles use is preferably made of a flexible connection in the form of so-called micro-strips on the compartment side of walls 11,12 which can close-fittingly accommodate the shape of the tile.

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For fixing of the tiles use can be made of a conventional tile cement for a direct fixing of the tiles to the surface. Use can however be made instead of a fixing of the tiles to the edge 16 of the grid element. For this purpose this edge can be provided beforehand with a suitable glue bead, a self-adhesive layer, a double-sided adhesive tape or a velcro®-strip or the like. The whole wall can thus be filled with tiles in a short time, wherein the compartments impart precisely the correct pattern to the final tile-work, and walls 11,12 provide an efficient and decorative joint sealing. The tile mounting system according to the invention is hereby particularly user-friendly and requires no, or hardly any, skill on the part of the user.

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Figure 4 shows an alternative embodiment of a tile mounting system according to the invention. Here also use is made of form-retaining grid elements 10 of high-density polyethylene or another suitable form-retaining plastic. Other than in the foregoing embodiment, use is made here of a standing rib 24 on a first longitudinal side of the grid element and a corresponding groove 25 on an opposite longitudinal side as coupling members for mutually coupling separate grid elements. The grid elements can thus be hooked or pushed into each other laterally to form the desired surface, wherein groove 25 of the one grid element overlaps the corresponding rib 24 on the adjacent grid element. Groove 25 is at least almost as wide on an outer side as a normal wall 11, 12 of the grid element. In a vertical direction use is made for the grid elements in this embodiment of standard dimensions of for instance 120 and 180 cm, corresponding to standard heights of walls occurring particularly in newly-built houses. In respect of height dimension the grid elements can thus be arranged in at least almost fitting manner without further extension. The tile system of this embodiment is otherwise comparable to the above described exemplary embodiment.

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Although the invention has been elucidated above on the basis of only a few exemplary embodiments, it will be apparent that the invention is by no means limited thereto. On the contrary, many variations and embodiments are still possible within the scope of the invention for the person with ordinary skill in the art.